

then in 525,600 n years the node for this portion would be moved completely round the Earth's orbit. For a smaller spreading smaller figures would be necessary.

16. In such an important matter it is of course eminently desirable to undertake a more elaborate investigation, and this I shall hope to do. Meanwhile these notes may at least, as suggested in § 10, have the desired effect of attracting attention to an interesting problem.

Observations of the Leonids at Perth Observatory, Western Australia. By W. E. Cooke.

A search was made for these at the Perth Observatory, W.A., on November 13 and 14. We confined our observations to counting the number seen in a particular region of the sky during each successive 15 minutes.

On the first night I took a circle of 10° radius round *Aldebaran*, and Mr. Yeates took the same-sized region round ζ *Leonis*. The night was brilliantly clear.

On the 14th Mr. Yeates took the same region as before. Mr. Curlewis took *Aldebaran*, and I took an irregularly shaped region visible through the shutter opening of the Dome, between *Sirius* and *Procyon*. My observations were slightly interrupted at times, as I had strapped a small camera on the astrographic mounting, and had to attend to this occasionally. The sky was generally clear, but some very thin stratus cloud drifted across from time to time.

The photographs produced no results of any value.

Results.

1898, November 13.

Observer	Region round	From 6.15 to 6.30	6.30 to 6.45	6.45 to 7.0	7.0 to 7.15	7.15 to 7.30	7.30 to 7.45	7.45 to 8.0 G.M.T.
Cooke	Aldebaran	...	...	...	0	1	0	0
Yeates	ζ Leonis	...	...	...	1	0	2	1

November 14.

Cooke	Sirius to Procyon	0	0	0	0	0	0	0
Curlewis	Aldebaran	0	2	1	1*	2	2†	3
Yeates	ζ Leonis	1	2	1	5	0	3	0

Perth Observatory, W.A.
1898, November 16.

* A brilliant one, straight through *Aldebaran* from the direction of ζ *Tauri*.

† A very brilliant one, just below *Aldebaran*, parallel to above, leaving luminous trail after disappearance.

Preliminary Description of the New Photographic Equatorial of the Cambridge Observatory. By Sir Robert Ball, Director of the Observatory.

There has recently been added to the equipment of the Cambridge Observatory a photographic equatorial of novel design, which is so bold a departure from the ordinary forms that it seems well to give a prompt preliminary description of it pending the appearance of a detailed description in the publications of the Observatory.

The essential features of the plan were proposed so long ago as 1884 by Sir Howard Grubb in a paper in the *Phil. Trans. R. Dubl. Soc.* (vol. iii. series 2, p. 61). The instrument is a *coudé* telescope, but of a different type from the *Équatorial Coudé* of M. Lœwy. A long and heavy tube is mounted on bearings top and bottom, so that its axis of rotation is the polar axis of the instrument. Towards its lower end is carried the declination axis, and upon this axis turns a short tube carrying the object-glass. Upon an axis concentric with the declination axis is carried a plane mirror, which is geared so as always to bisect the angle between polar axis and objective tube. If, then, the objective tube is directed to any star, the convergent beam from the object-glass is received by the plane mirror, reflected up the polar tube, and brought to a focus at the upper end of the tube. The observer remains in a fixed position, looking down the polar tube from the top. If, then, the polar tube is carried up into a closed room, while the rest of the instrument is mounted under a cover, which can be moved right away, leaving it in the open air, the observer can work in a closed and comfortably warmed room, and can from it command any part of the sky within range of the instrument without the continual trouble of moving dome and shutters.

This form of *coudé* has the advantage over that of M. Lœwy that only one plane mirror is required instead of two. It has, of course, on the other hand, the disadvantage that the regions close to the pole are cut off by the building. It has the advantage over all forms of fixed telescope fed by a heliostat or celostat that the angle of incidence on the plane mirror does not alter during the exposure on a given object, though it is different for objects of different declinations.

While the observatory syndicate was discussing the question of building a photographic equatorial a letter was received from Professor Turner and Dr. Common bringing to their notice the advantages of this new form of equatorial, and urging them not to neglect the opportunity, which so rarely presents itself, of building a large instrument upon original lines. This proposal was favourably entertained by the syndicate, and the plans for the new instrument were prepared by Sir Howard Grubb.